OCTOBER • 1954

NLGI Spokesman

Journal of National Lubricating Grease Institute

Annual Meeting Issue

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PRESIDENT'S PAGE

State of California
GOVERNOR'S OFFICE
SACRAMENTO

October 1, 1954

TO THE MEMBERS OF THE
NATIONAL LUBRICATING GREASE INSTITUTE:

I am pleased to have this opportunity to join in extending a cordial welcome on the occasion of your initial meeting in California.

In selecting San Francisco as the site for your 23rd annual meeting on October 25, 26 and 27, you give recognition to the tremendous growth California has experienced in recent years. The rapid industrial expansion which has accompanied this growth brought with it increased demands for lubricants, and the manner in which these demands were met provides an eloquent testimonial to the alertness and ingenuity of your membership.

As the Nation's second largest producer and the leading consumer of oil and petroleum products, California takes particular interest in the future of your industry, and we are grateful for the opportunity of acting as host to your organization.

I hope that you will have a successful and productive convention and that opportunities will be afforded during your stay in our State to enjoy the outstanding recreational, scenic and cultural attractions which we proudly offer our guests.

Cordially,

Goodwin J. Knight

Goodwin J. Knight
Governor of California

GJK:ajc

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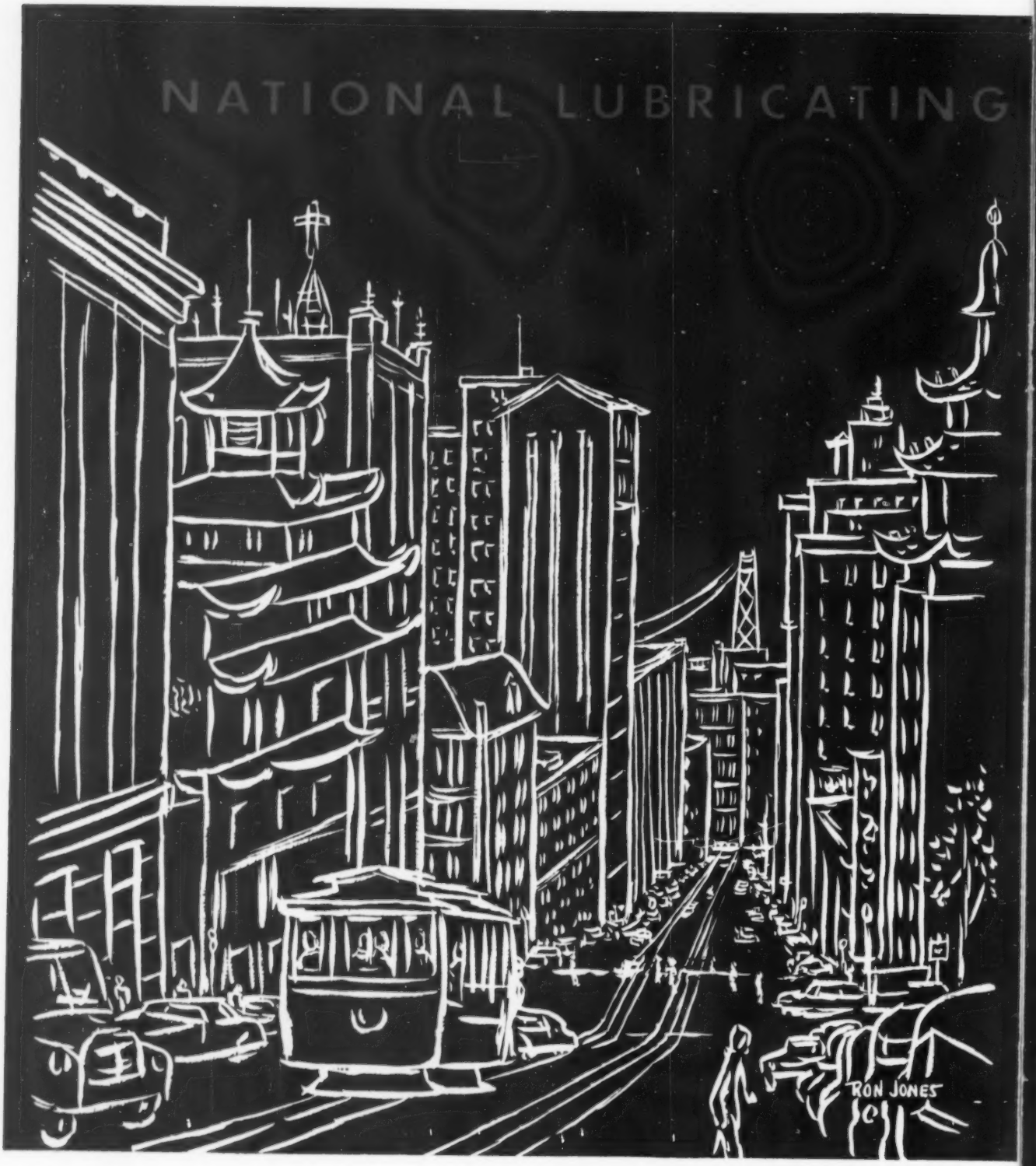
NLGI Spokesman

Vol. XVIII OCTOBER, 1954 No. 7

IN THIS ISSUE

ABOUT THE COVER

Like the cover of most magazines the Spokesman tries to do the obvious. This month readers are looking to San Francisco and the NLGI annual meeting there, October 25-27 at the Mark Hopkins Hotel. Artist Ronald Jones couldn't resist the temptation to again be obvious with his depiction of the best known scene of San Francisco.



OUR TWENTY-SECOND ANNUAL MEETING . . . .

GREASE INSTITUTE

SUNDAY, OCTOBER 24

REGISTRATION—Room of the Dons—1:00 p.m.-9:00 p.m.

MONDAY, OCTOBER 25

REGISTRATION—Room of the Dons—8:30 a.m.-10:00 a.m.

MORNING SESSION—Peacock Court—10:00 a.m.

H. L. HEMMINGWAY, Chairman

1. Address of Welcome—

G. A. Olsen, President

2. The Agricultural Market—Its Significance and Prospects

Jesse W. Tapp, Vice Chairman of the Board of Directors, Bank of America

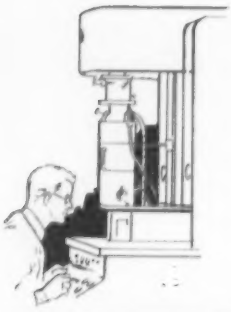
JESSE W. TAPP

Jesse W. Tapp is Vice Chairman of the Board of Directors, Bank of America and its adviser on Agricultural financing policies. He is a member of the institution's Managing Committee. In addition he is a member of the Management Forum, the General Finance Committee, the advisory Council of the Board of Directors, and its Executive Committee.

Previously he occupied positions with the United States Department of Agriculture as associate administrator of the Agricultural Adjustment Administration, and as a director of related organizations.

A native of Kentucky, he is a graduate of the College of Agriculture of the University of Kentucky and has done graduate work in economics at Harvard and the University of Wisconsin. He is a member of the agricultural committee of the California State Chamber of Commerce, of the Agricultural Commission of the American Bankers Association and of the advisory committee of the National Cotton Council. Currently he is serving his immediate community as 1954 president of the San Francisco Chamber of Commerce.

Mr. Tapp is a member of two commissions recently appointed by President Eisenhower—the Commission on Foreign Economic Policy and the Commission on Agricultural Policy. He also holds membership in the Credit Policy Commission of the American Bankers Association.



MONDAY, OCTOBER 25

AFTERNOON SESSION—Peacock Court—2:00 p.m.

W. M. MURRAY, Chairman

3. SYMPOSIUM—Studies of Grease Structure—A Basis for New Developments

L. C. BRUNSTRUM, Panel Chairman
Standard Oil Company (Indiana)

L. C. BRUNSTRUM

L. C. Brunstrum has been a member of the research department of the Standard Oil Company (Indiana) since he received his B.S. in chemical engineering from Armour Institute of Technology in 1929. He is currently the section leader in charge of greases and industrial lubricants. He is a member of the A.C.S., Society of Rheology, and A.S.I.E.

Abstract

Scientists have learned that the fibers in only a spoonful of lubricating grease would reach to the moon if laid end to end. These superfine fibers are what holds the oil in place in the grease and keeps it from being a liquid. How they are arranged has a lot to do with how well the grease lubricates your car, for example.

Your panel members have come from laboratories in this country and Canada. Their purpose here is for all of us to learn from each other more about the internal structure of greases. They will discuss new findings reported by four eminent speakers. They have studied photographs of grease fibers too small to be seen until magnified 50,000 times.

Such increased knowledge of the very nature of greases is a big help to the chemists who are developing better lubricants for the increasingly complex machines of tomorrow.

STRUCTURE OF LUBRICATING GREASE

Dr. Ira E. Puddington, National Research Council of Canada

Ira E. Puddington, a Canadian, received his B.Sc. degree from Mount Allison University in 1933. He received his M.Sc. and Ph.D. degrees from McGill in 1936 and 1938, respectively.

In 1938 Dr. Puddington joined the staff of the National Research Council of Canada where he has headed the Colloids section for the last twelve years. In 1952 he became Director of NRC's Division of Applied Chemistry.

Abstract

This paper contains an extensive review of the structure of greases with particular emphasis upon indirect methods. It is strengthened by further concepts of structure as observed during the experiences of the author. Several criteria of desirable grease structure are suggested.

IRA E. PUDDINGTON
" . . . an extensive review . . . "

OPTICAL STUDIES OF LUBRICATING GREASE STRUCTURE

Dr. B. W. Hotten, California Research Corp.

Bruce W. Hotten received a B.A. in chemistry from the University of Cincinnati in 1941 and a Ph.D. in organic chemistry from Purdue University in 1945. He worked for a year at Purdue as a postdoctorate fellow on a Manhattan District project concerning synthesis of fluorocarbons. Then he joined the California Research Corporation, Richmond, California, where he is a research chemist in charge of fundamental formulation studies on lubricating greases. He is a member of Phi Beta Kappa, Sigma Xi, Phi Lambda Upsilon, Alpha Chi Sigma, A.C.S., and The Society of Rheology.

Abstract

This review of the optical study of grease structure consists of four parts. First the tools used and the type of information obtainable from each will be described. Then some general principles of structure so far discovered with the aid of these tools will be presented in terms of quantitative relationships as far as possible. The crystalline form of some of the newest types of thickening agents will be shown. Finally the most important subjects for future structure research will be pointed out.

B. W. HOTTEN
" . . . consists of four parts . . . "

THICKENER-PARTICLE DIMENSIONS AND LUBRICATING GREASE CONSISTENCY

Dr. R. H. Leet, Standard Oil Company (Indiana)

Richard H. Leet received his B.S. in Chemistry at North West Missouri State College in 1948. He received his Ph.D. in Physical Chemistry from the Ohio State University in 1952. After his graduation, he joined the Whiting Laboratories of Standard Oil Company (Indiana) where he is a research chemist. He is a member of ACS, MAIC, and the Society of Rheology.

Abstract

Changes in the consistency of greases were investigated by means of the apparent changes in the thickener-particle sizes that occurred upon working and subsequent aging. Thirteen widely different greases showed correlations between penetration and length-to-width ratio of the particles. In nine cases, the ratio decreased during working as the grease softened and increased during aging as the grease hardened. In the other four cases, the ratio again decreased during working as the grease softened, but, during aging, rapid hardening occurred independent of the ratio; after one to three months of aging, the ratio increased linearly as penetration decreased. The results suggest two distinct types of consistency change during hardening: (1) that arising from changes in particle shape, and (2) that arising from interparticle attractions.

R. H. LEET
" . . . changes in the consistency . . . "

FORCES RESPONSIBLE FOR LUBRICATING GREASE STRUCTURE

Dr. M. J. Vold, University of Southern California

Dr. M. J. Vold was born in Canada (1913) but grew up in California, attending the University of California at Berkeley from 1930 to 1936. She received her B.S. in chemistry in 1934 and was awarded the University Medal as class valedictorian. Her Ph.D. work was in the field of reaction kinetics and was carried out under the direction of Dr. Axel R. Olson. She was at the University of Utrecht as a Guggenheim Fellow during the academic year 1953-54.

Abstract

It is shown that London-van der Waals attractive forces between randomly crossed soap fibers in oil yield junction points adequate to account for the yield value and consistency of greases. A method is presented describing practical grease properties in terms of curves of total interaction energy as a function of particle separation. Phenomena such as shear breakdown, age and work hardening, and thixotropy depend on the existence of repulsive forces strong enough to exceed the attractive forces and create a potential barrier to the re-formation of ruptured junctions. Electrostatic repulsion, steric forces, and dipole repulsion provide possible sources for such a barrier. Their relative importance depends upon particle size as well as the chemical nature of oil and soap.

M. J. VOLD
" . . . electrostatic repulsion, steric forces, and dipole repulsion . . . "

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Here are two applications where greases must take the heaviest sort of punishment — and do a first-rate job of lubrication:

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The problem of producing lubricants able to "stand the gaff" on this job has proved a very difficult one—but it has been solved. One of the nation's leading grease manufacturers, after trying all sorts of greases, is having outstanding success with grease based on a Metasap Aluminum Stearate.

2. Farmers operating along, or near, seacoasts have particular difficulty in protecting their machinery from rust and corrosion during inclement weather—due to salt being carried inland and adding its destructive power to that of moisture and rain.

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PANEL AND FLOOR DISCUSSION

Dr. Arnold Bondi, Shell Development Company

Arnold Bondi was born in 1916 in Hamburg, Germany, where he also received his education. The late Professor E. L. Lederer, one of the deans of soap chemistry, indoctrinated him into colloid physics. After coming to this country he worked in the fields of textile chemicals, white oil manufacture, and lubricating oil refining. He apprenticed as grease cook with Harold M. Fraser at International Lubricant Corp. in New Orleans from 1944 through 1946 and was transferred to Shell Development Co., Emeryville, California, his present location, in January 1947. Lubricating grease is still one of his charges.

Mr. Bondi is a member of the American Chemical Society, the American Institute of Chemical Engineers, the Society of Rheology, and the American Institute of Physics, and Sigma Xi. He has published numerous papers and, recently, also a book on the Physical Chemistry of Lubricating Oils.

ARNOLD BONDI

PANEL

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Tokyo, Japan

PANEL AND FLOOR DISCUSSION—Dr. A. Bondi

ANNUAL BUSINESS MEETING—Peacock Court—4:45 p.m.

L. J. GRUNDER

JAMES H. BOOTH

FRANK R. HART

TUESDAY—OCTOBER 26

MORNING SESSION—Peacock Court—9:00 a.m.

H. L. HEMMINGWAY, Chairman

4. Panel Discussion—"Field Evaluation of Lubricating Greases in Fleets and Cars"

PANEL CHAIRMAN

L. J. Grunder
Richfield Oil Corp.

PANEL MEMBERS

James H. Booth
Thompson Products, Inc.

F. R. Hart
Standard Oil of California

Claude Johnson
Jesco Lubricants Company

H. R. Wolf
General Motors Research Organization

H. C. Zweifel
Richfield Oil Company

Lawrence J. Grunder obtained his B.S. degree in Mechanical Engineering from California Institute of Technology in 1929. He did graduate work at Pennsylvania State University in lubrication research. In 1939, Mr. Grunder joined Richfield Oil Corporation of Los Angeles. He is now Manager of Fuels and Lubricants Development of that company.

James H. Booth attended Germantown Friends' School, Pennsylvania State College for Engineering, and Pennsylvania Night School for Business Administration.

Mr. Booth spent seven years with Duesenberg Brothers, designing and building racing cars and engines. He also spent seven years with the Buick Motor Division of General Motors Corporation as Chassis Division Engineer, in charge of Chassis Design. For twelve years he has been Chief Engineer, Michigan Division, Thompson Products, Inc., in charge of Engineering Department.

Mr. Booth has been very active in ASME, SAE, and other engineering groups.

Frank R. Hart has been connected with the Standard Oil Company of California, Marketing Department, for the past 35 years. Presently he is a Senior Specialist in the Lubricant Division, in charge of automotive gear lubricants and greases. He has had broad experience in all phases of marketing these products, the formulation and direction of sales programs, the preparation of lubrication charts, the investigation and adjustments of product service complaints, the field testing of new products, the dispensing and application of these lubricants, as well as the lubrication requirements of all automotive and farm equipment.

CLAUDE L. JOHNSON

C. L. Johnson is a native of Nevada, Missouri, and spent his early childhood in the Indian Territory. For several years he was engaged in cattle raising and farming in the Cherokee Strip. He obtained his B.S. degree from the University of Oklahoma.

From 1917 until 1929, Mr. Johnson was chief chemist at the Marland Refining Company, Ponca City, Oklahoma. In 1929 he became one of the organizers of the Jesco Lubricants Company.

H. R. Wolf, who will present the viewpoints of the Chassis Engineers of General Motors Corporation in the Panel Discussion has been connected with the automobile industry since 1912. He is at the present time Consulting Petroleum Technologist, Research Laboratories Division, General Motors Corporation.

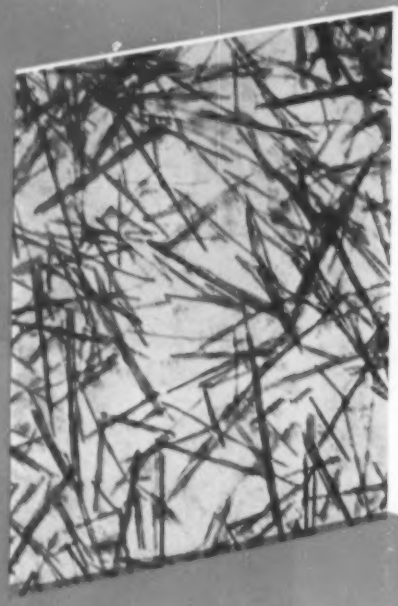
H. R. WOLF

Mr. Wolf has been actively engaged for many years in research on automotive lubricants and their application. He has presented many technical papers before the SAE, API, ASTM, NPA and NLGI.

Mr. Wolf is a member of the American Society for Testing Materials and the American Chemical Society. He is a member of the SAE Technical Committee on Fuels and Lubricants and ASTM Committee D-2 on Petroleum Products and Lubricants. He is a member of other related SAE and ASTM Committees and is Chairman of ASTM Committee D-15 on Engine Antifreeze.

H. C. Zweifel of Richfield Oil Corporation, Los Angeles, California, received his degree in chemistry from the University of Southern California in 1932. From that time until 1935, he was employed by the Shell Oil Company, Inc., in research work. From 1936 to date, he has been with Richfield in various positions in the laboratories and refinery operations. For the past fifteen years, his time has been devoted to the development of asphaltic products and lubricants. He was in charge of the grease manufacturing and oil compounding plant for two years. He is currently Supervisor of the Lubricants Development Division

H. C. ZWEIFEL



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THERMAL STABILITY	EXCELLENT
WATER RESISTANCE	EXCELLENT
CORROSION PROTECTION	EXCELLENT
REPRODUCIBILITY	EXCELLENT

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That's why many leading grease producers have responded enthusiastically to Permagel, our versatile new multi-purpose grease thickener. Greases formulated with Permagel score high under the most rigorous conditions. They demonstrate excellent resistance to mechanical shear, outstanding thermal stability, effective water resistance and corrosion protection . . . remain stable and consistent in roughest duty.

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TUESDAY–OCTOBER 26

AFTERNOON SESSION—Peacock Court—2:00 p.m.

G. A. OLSEN, Chairman

5. Some New Approaches to the Measurement and Prediction of the Apparent Viscosity of Lubricating Grease

J. L. DREHER C. F. CARTER E. B. REID

California Research Corporation

J. L. DREHER

C. F. Carter obtained his B.S. degree from Polytechnic College of Engineering in 1934. In 1935 he was employed by California Research Corporation (Standard Oil Company of California). For the past fifteen years he has been engaged in the development and manufacture of lubricating greases.

Mr. Carter is a member of A.S.L.E.

C. F. CARTER

J. L. Dreher obtained his A.B. degree in chemistry from U.C.L.A. in 1935. He then was employed by General Petroleum Corporation in Los Angeles. In 1934 he joined Metallurgical Laboratories (Atomic Bomb Project) at the University of Chicago. He transferred to Hanford Engineering Works (Du Pont) in Richland, Washington in 1944 and to California Research Corporation (Standard Oil Company of California) in 1945.

Mr. Dreher is a member of the American Chemical Society, Alpha Chi Sigma, and A.S.L.E.

E. B. Reid obtained his B.S. degree from the University of California in 1935. His M.S. and Ph.D. degrees in chemistry from the University of Michigan were obtained in 1938 and 1939, respectively.

Mr. Reid joined the Petroleum Process Research Group at California Research Corporation (Standard Oil Company of California) in 1939. He spent the war years in Chemical Warfare Service of the U. S. Army.

In 1946 Mr. Reid returned to California Research Corporation and is presently in charge of Mathematical Services Group. He is a member of the American Chemical Society, Sigma Xi, and Phi Lambda Upsilon.

E. B. REID

Abstract

The design of apparatus for the measurement of apparent viscosities of greases is described. The principal features of the apparatus are: (1) a circular, constant temperature bath enclosing the grease samples and capillaries; (2) a hydraulic system with the pump located outside the bath; and (3) a provision for the direct measurement of flow rates. The advantage of direct measurement of flow rates over precalibration of the pump as described by both Federal and ASTM procedures is discussed. Relationships based on correlations established in the IBM computer are given to show the dependence of the apparent viscosity at −65°F on such grease variables as soap content, viscosity of the mineral oil component, and consistency. Data are presented for a mixed lithium calcium stearate-mineral oil grease which complies with Automotive and Artillery Grease Specification MIL-G-10924 (Amendment 1). With the established relationship, it is possible to predict the apparent viscosity of this grease at −65°F from its soap content, viscosity of the oil component, and penetration.

6. Estersils—A New Class of Siliceous Thickening Agents

Dr. G. C. Meyer **R. O. Braendle**
California Research Company

G. C. MEYER

Gregory C. Meyer grew up in central Texas and received his B.A. degree from Southwestern University in 1938. After receiving M.A. and Ph.D. degrees from the University of Nebraska in 1941 and 1943, he joined the Organic Chemicals Department of the Du Pont Company, where he has worked with fluorine chemicals, dyes, dye intermediates, and additives for lubricating oils and greases. He is a member of A.C.S., S.A.E., and Sigma Xi.

R. O. BRAENDLE

Richard O. Braendle received his B.S. degree in chemical engineering from the Massachusetts Institute of Technology in 1944. He has been with the Du Pont Company since that time except for a two-year interval of service with the Army in connection with the Manhattan District project. Mr. Braendle was initially engaged in use research on silica products with the Grasselli Chemicals Department and in 1952 joined the New Product Development Group of the Petroleum Chemicals Division. He is a member of A.C.S., A.S.L.E., and has been active in A.S.T.M.

Abstract

Surface esterification of certain finely divided siliceous solids yields a new class of inorganic grease thickeners, called estersils. Factors involved in the selection of a preferred estersil grease thickener and the results of a laboratory evaluation of the preferred product are discussed. Considerable promise was indicated for the use of estersil greases in multipurpose and specialty type applications. Additive-free greases prepared from the preferred estersil were found to have water resistance, mechanical stability, little change of consistency with temperature, no melting point, good stability in oxygen bomb tests, and to be compatible with soap greases in laboratory wheel bearing tests.

DISCUSSION

A. Bondi* **W. H. Peterson**
Shell Development Company

W. H. Peterson received his B.S. degree in Chemical Engineering from the University of California in 1936. On graduation he joined the Research

*Picture and biography on page 13

staff of the Shell Development Co. at Emeryville. For the past seven years he has been actively engaged in grease research, some of the results of which have appeared in the scientific and patent literature.

W. H. PETERSON

Abstract

The Estersils are compared with the other gelling agents currently available, with respect both to structure and the nature of the attachment of the water-proofing coating to the particle surface. What appears to be the major remaining deficiency of many inorganic-base greases, their insufficient rust-preventive ability, is discussed.

W. L. HAYNE

DISCUSSION

D. R. Oberlink **W. L. Hayne**

Standard Oil Company (Indiana)

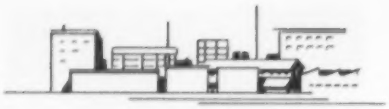
W. L. Hayne spent three years in the Navy Submarine Service before completing his education at the University of Louisville. After receiving both a B.S. and M.S. degree in 1947, he became a member of the Standard Oil Company (Indiana). He is currently a Research Chemical Engineer in the Whiting Research Laboratories. He is a member of Sigma Tau, Theta Chi Delta, American Institute of Chemical Engineers and American Society of Lubrication Engineers.

D. R. OBERLINK

D. R. Oberlink became a member of the Standard Oil Company (Indiana) Research Department in 1934 after receiving a B.S. degree from the University of Illinois. Transferring to the Industrial Sales Department in 1937, he held various positions until entering the Navy in 1943. Since 1947, he has been a Product Engineer in the Sales Technical Service Department.

Abstract

A grease prepared from an Estersil thickener is in commercial use. This grease has performed satisfactorily in a variety of severe industrial applications. Several of these services and related conditions are discussed.



7. The New Look in Grease Manufacturing Facilities

Descriptions of the newest lubricating grease manufacturing facilities in North America

O. L. YARHAM

SELECTION OF EQUIPMENT FOR SUCCESSFUL OPERATION OF A NEW GREASE PLANT

O. L. Yarham, Cities Service Research and Development Company

O. L. Yarham received a B.S. in chemical engineering from the University of Kansas in 1940. After a short period with Joseph E. Seagram and Sons, he was in chemical engineering research for the U. S. Department of Agriculture Regional Research Laboratories at Peoria, Illinois, and Wyndmoor, Pennsylvania.

From 1944 to 1950, he was a research chemical engineer on lubricating grease development and was also responsible for all equipment design, engineering and plant construction for the Battenfeld Grease and Oil Corporation.

Since early 1950, he has been supervisor of the lubricating grease research laboratory of Cities Service Oil Company and is also in technical service to marketing and manufacturing.

Mr. Yarham is a member of Sigma Tau.

Abstract

Today's lubricating grease manufacturers are finding it necessary to meet demands for much better products.

Manufacturing costs have increased to a greater extent than have prices of lubricating greases.

These factors make it more important than ever before to provide adequate efficient manufacturing facilities.

Trends and basic considerations in the design and selection of new grease plant equipment are covered. The necessity of making maximum use of mechanical power and labor saving machinery is discussed.

R. O. RINEARSON

THE NEW BRITISH AMERICAN GREASE PLANT

R. O. Rinearson, British American Oil Company, Ltd.

Roy O. Rinearson studied petroleum chemistry at Phillips University after a course in business administration at Oklahoma A & M College. He also took other courses at Oklahoma University and Western Reserve University.

Prior to joining British American, Mr. Rinearson had worked for the Warren Refining & Chemicals Co., Cleveland, The Hodson Company, Chicago, and the Champlin Refining Company, Enid, Okla.

Since 1952 he has been superintendent of B-A's Compounding and Blending Plant and of their Grease Plant, both located at the company's refinery at Clarkson, Ontario.

Abstract

A description of the planning, design and installation at the recently completed Grease Plant of The British American Oil Company Limited at Clarkson, Ontario, Canada. The plant embodies the most recent processing methods supported by an improved materials handling system for maximum efficiency and economy in operation.

MODERN LUBRICANTS FROM A MODERN PLANT

E. L. Sutton, The Pure Oil Company

E. L. SUTTON

E. L. Sutton joined The Pure Oil Company at their Heath Refinery near Newark, Ohio, in 1929. After a number of years in the laboratory, he was transferred to operations. He attended Denison University and Cornell University just prior to going on active duty in the United States Navy. He served aboard the U.S.S. Charles E. Brannon in both the Atlantic and South Pacific, advancing to the rank of Lt. Commander. He returned to The Pure Oil Company in 1946 and was assigned to their Cabin Creek Refinery in West Virginia. In 1947 he was transferred to Grease Manufacturing Division, then located in Marcus Hook, Pennsylvania. In 1948 he spent some time at the Research Laboratory near Chicago. In 1949 he moved to Smiths Bluff Refinery near Beaumont, Texas, to assist in the operation of Pure's new Grease, Compounding, and Blending Plant. He was placed in charge of this operation in 1951.

Abstract

The operation covered in this paper is part of the Smiths Bluff, Texas, Refinery of The Pure Oil Company. It is unique in that the grease manufacturing equipment is part of a complete new lubricants manufacturing plant built from the ground up. Another unique feature of this plant is the combination in one operation of all of the grease manufacturing, blue oil blending, compounding and all of the related packaging operations under one roof. The presentation is amply illustrated to completely describe the facilities.

KEEPING GREASE MANUFACTURING UP TO DATE

E. W. Nelson and R. R. Trengove, Continental Oil Company

E. W. NELSON

E. W. Nelson is a member of the Development and Research Department of Continental Oil Company. He received his B.S. degree from Bethany College in Kansas. After spending two years as a teacher of high school physics and chemistry, he attended the University of Minnesota where he received his M.S. degree in Chemical Engineering. Except for a two year period in the paint and varnish industry, his entire career has been in the petroleum field, primarily in the line of lubricating greases and cutting oils. Since his employment shortly preceded the company's entrance into the grease manufacturing field, he has been instrumental in the development and control of their entire line of lubricating greases.

Roger Trengove is a native of Arizona and received his B.S. degree in Chemistry from the University of Arizona. After two years of graduate work in Chemical Engineering at MIT he was employed by the Ashland Refining Company in Kentucky. Since 1936 he has been with the Continental Oil Company, serving in various technical capacities. The last eleven years he has been a supervisor in grease manufacture.

R. R. TRENGOVE

Abstract

Although the Continental Grease Plant has been built more than twenty-five years, it is still in a relatively modern condition. Changes and improvements have been affected as requirements have demanded with an attempt to keep operations and production capacity as flexible as possible. Some of the changes which have been found particularly suitable are presented in this paper. Facilities are available for the manufacture of all types of lubricating greases.

SOCIAL HOUR—Top of the Mark—6:00 p.m.

ANNUAL DINNER—Peacock Court—7:00 p.m.

T. G. ROEHNER

NLGI Technical Committee Meeting

T. G. Roehner, Chairman

October 27, 1954

9:30 a.m.-12:00 noon

I. REPORTS OF SUBCOMMITTEES

1. *NLGI Classification of Lubricating Greases*
   H. C. Zweifel, Richfield Oil Corp.

   Two study groups have been organized as authorized at last year's Technical Committee Meeting. A report will be given of the status of their activities.

2. *Procurement of Technical Papers for Publication in the NLGI Spokesman* .....C. J. Boner, Battenfeld Grease & Oil Corp.

   Chairman Boner will have some suggestions regarding steps to obtain good technical papers for publication in the *NLGI Spokesman.*

3. *Editorial Review* .....B. B. Farrington, California Research Corp.

   Their activities for the past year will be reviewed.

4. *Research Fellowship* .....E. W. Adams, Standard Oil Co. (Indiana)

   A. Report by NLGI Fellow–Valeria Artel will present the high-lights of progress made during the past year.

   B. A motion will be submitted to the effect that the NLGI Research Fellowship be continued for another year at the University of Southern California under Dr. R. P. Vold.

5. *Manual of Test Methods and Definitions of Terms Peculiar to the Lubricating Grease Industry*
   W. J. Ewbank, Cato Oil & Grease Company

   Chairman Ewbank will raise questions concerning the plans for further work on this project.

6. *Recommended Practices for Packing Automotive Front Wheel Bearings* .....H. L. Hemmingway, The Pure Oil Company

   Mr. Hemmingway will have printed copies of the Recommended Practices for distribution at the meeting. Proposals will be submitted regarding the next steps to promote widespread adoption.

7. *Delivery Characteristics of Dispensing Equipment for Lubricating Greases* .....N. Marusov, Gulf Research & Development Co.

   Copies of the "Proposed NLGI Tentative Method for Matching Lubricating Grease Flow Properties with Lubricating Grease Dispensing Pump Delivery Behavior at Low Temperatures" will be available at the meeting. A motion will be made regarding formal NLGI approval. Steps to promote industry-wide support of the method will be discussed.

8. *AFBMA-NLGI Cooperative Committee on Grease Test Methods* .....T. G. Roehner, Socony-Vacuum Oil Company, Inc.

   A report will be submitted covering the discharge of this Committee.

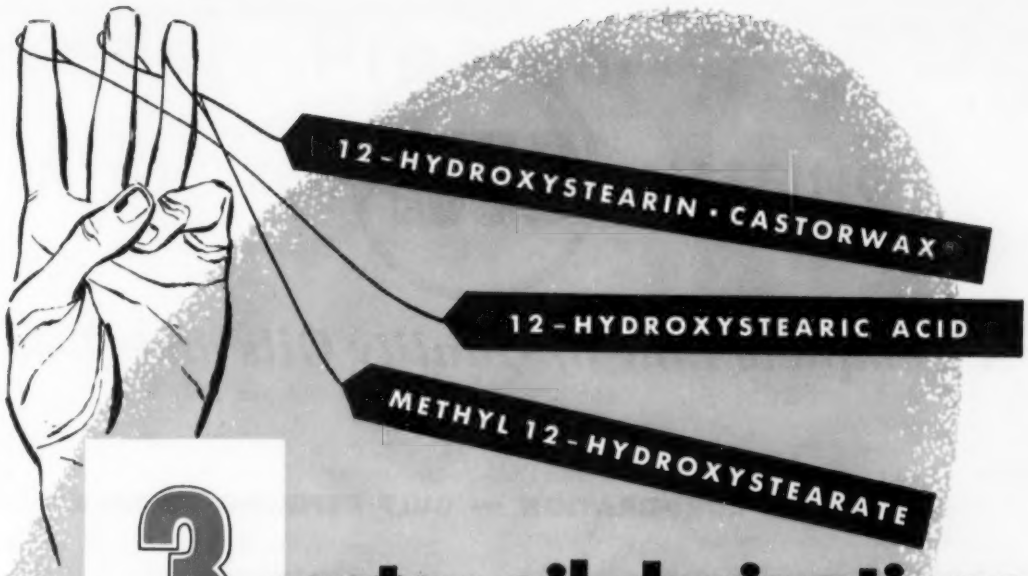
9. *Joint Committee on Lubricating Greases for Railroad Anti-Friction Journal Bearings*
   T. G. Roehner, Socony-Vacuum Oil Co., Inc.

   The current status of their activities will be outlined.

10. *Symposium on Studies of Grease Structure–A Basis for New Developments* ..L. C. Brunstrum, Standard Oil Co. (Indiana)

    Questions will be raised as to whether another symposium should be organized by the Technical Committee for the 1955 Annual Meeting. If the consensus is favorable, then suggestions will be requested regarding the subject which would have widest acceptance. Experience with the 1954 Symposium will be reviewed to determine where improvements for future symposiums are indicated.

II. NEW BUSINESS



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Program

NLGI 22nd ANNUAL MEETING

MONDAY—OCTOBER 25

REGISTRATION–Room of the Dons–8:30-10:00 a.m.

MORNING SESSION – Peacock Court–10:00 a.m.–Chairman, H. L. Hemmingway

1. *Address of Welcome*–G. A. Olsen, President
2. *The Agricultural Market–Its Significance and Prospects*–Jesse W. Tapp, Vice Chairman of the Board of Directors, Bank of America

AFTERNOON SESSION–Peacock Court–2:00 p.m.–Chairman, W. M. Murray

3. *Symposium–Studies of Grease Structure–A Basis for New Developments*–Panel Chairman, L. C. Brunstrum, Standard Oil Company (Indiana)
   - A. *Structure of Lubricating Grease*–Dr. Ira E. Puddington, National Research Council, Canada
   - B. *Optical Studies of Lubricating Grease Structure* –Dr. B. W. Hotten, California Research Corp.
   - C. *Thickener-Particle Dimensions and Lubricating Grease Consistency*–Dr. R. H. Leet, Standard Oil Company (Indiana)
   - D. *Nature of the Forces Responsible for the Formation of Lubricating Grease Structure*–Dr. Marjorie J. Vold, University of Southern California
   - E. Panel Discussion–Dr. Arnold Bondi, Shell Development Company (Discussion Leader)
   - F. Question Period

ANNUAL BUSINESS MEETING–Peacock Court–4:45 p.m.

TUESDAY—OCTOBER 26

MORNING SESSION–Peacock Court–9:00 a.m. Chairman, H. L. Hemmingway

4. Panel Discussion–*Field Evaluation of Lubricating Greases in Fleets and Cars*–Panel Chairman L. J. Grunder, Richfield Oil Corporation–Panel Members –Frank R. Hart, Standard Oil of California–Claude Johnson, Jesco Lubricants Company–H. C. Zweifel, Richfield Oil Company–H. R. Wolf, General Motors Research Organization

STYLE SHOW AND LUNCHEON for the LADIES San Francisco Yacht Club–12:00 Noon

AFTERNOON SESSION–Peacock Court–2:00 p.m.–Chairman, G. A. Olsen

5. *Some New Approaches to the Measurement and Prediction of the Apparent Viscosity of Lubricating Grease*–J. L. Dreher, C. F. Carter and E. B. Reid, California Research Company
6. *Estersils–A New Class of Siliceous Thickening Agent* –Dr. G. C. Meyer and R. O. Braendle, E. I. du Pont De Nemours and Company, Inc.

   Prepared Discussion–Dr. A. Bondi and W. H. Peterson, Shell Development Company, and W. L. Hayne and D. R. Oberlink, Standard Oil Company (Indiana)
7. *The New Look in Grease Manufacturing Facilities–Descriptions of the Newest Lubricating Grease Manufacturing Facilities in North America*
   - A. *Selection of Equipment for Successful Operation of a New Grease Plant*–O. L. Yarham, Cities Service Research and Development Company
   - B. *The New British-American Grease Plant*–R. O. Rinearson, British-American Oil Co., Ltd.
   - C. *Modern Lubricants from a Modern Plant*–E. L. Sutton, The Pure Oil Company
   - D. *Keeping Grease Manufacture Up to Date*–E. W. Nelson and R. R. Trengove, Continental Oil Co.

SOCIAL HOUR–Top of the Mark–6:00 p.m.

ANNUAL DINNER–Peacock Court–7:00 p.m.

WEDNESDAY—OCTOBER 27

NLGI TECHNICAL COMMITTEE MEETING, Peacock Court–9:30 a.m.-12:00 noon–Chairman, T. G. Roehner

8. Reports of Subcommittees

TRIP FOR THE LADIES–Muir Woods–9:30 a.m.-2:00 p.m. (Compliments of N.L.G.I.)

NLGI Associate and Technical Mem

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Vulcan Stamping & Mfg. Co.
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Representative—H. B. Scharbach

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Representative—Richard P. Field

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Representative—D. C. Peterson

United States Air Compressor Co.
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Representative—C. A. Bening

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Representative—Hal U. Fisher

Canadian Petrofina Limited
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Montreal, Quebec, Canada
Representative—M. E. Wight

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Representative—H. F. Wagner

Mid-Continent Petroleum Corp.
Mid-Continent Bldg., P. O. Box 381, Tulsa, Okla.
Representative—J. W. Basore

Valvoline Oil Company
Division of Ashland Oil & Refining Co. Box G
Freedom, Pennsylvania
Representative—D. A. Smith

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Buflovak Equipment Division
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Representative—David F. O'Keefe

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Representative—George E. Missbach

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Representative—C. W. Nofsinger

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Representative—D. H. Putney

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Representative—Abner C. Hopkins, Jr.

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Representative—W. G. McLeod

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Representative—W. J. Straka

Leffingwell Chemical Company
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Representative—D. E. Murphy

Lithium Corporation of America, Inc.
Rand Tower, Minneapolis 2, Minnesota
Representative—Walter M. Fenton

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Representative—C. E. Cosby

N. I. Malmstrom & Company
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Representative—Ivar Wm. Malmstrom

Metasap Chemical Corporation
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Representative—R. H. Hubbell, Jr.

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Representative—J. W. Newcombe

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Baroid Sales Div., 111 Broadway, N. Y. 5, N. Y.
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Representative—Richard Bender

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Vopcolene Division
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Representative—C. F. Williams

Warwick Chemical Company
Division Sun Chemical Corp., 10-10 44th Ave.
Long Island City 1, New York
Representative—Dr. J. J. Whitfield

Witco Chemical Company
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Representative—E. F. Wagner

TECHNICAL AND RESEARCH ORGANIZATIONS

Institut Francais du Petrole
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Ruell—Malmaison (S. et Oise) France

Les Laboratoires de Recherches Purfina
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Representative—Manuel Corda Boullosa

Patents and Developments

Anhydrous Soda Base Greases

Soda base greases containing small amounts of higher polyalkylene glycols (i.e higher than trialkylene glycol) are disclosed in the U. S. Patent 2,678,918 issued to Shell Development Company. The liquid glycols employed have molecular weights between 200-600, while the solid ones are in the higher range of 1000-7000.

It is well known that soda soap greases are exceptionally sensitive to rapid cooling from a highly heated state to a solid state. This makes it necessary to cool the grease slowly from its hot liquid state in a period of 12-16 hours when cooled in layers of 3-5 inch thickness, thus inhibiting bleeding.

According to the aforesaid patent, quick cooling is possible and bleeding is prohibited by incorporating into the grease the small amount 0.1-0.3% of the polyalkylene glycol, the cooling being done preferably in thin layers averaging 1/16-½ inch in thickness. Typical glycols which may be used are the polyethylene glycols, polypropylene glycols, polybutylene glycols, polyamylene glycols, and polyhexylene glycols.

A completely reversible soda soap base grease (which can be remelted and cooled without change in properties) is claimed to be possible when .05% or more of polyalkylene glycol is employed. It was found necessary to add 0.3-1% of sodium naphthenate to the grease to insure mechanical stability and non-bleeding.

Indogen Thickened Greases

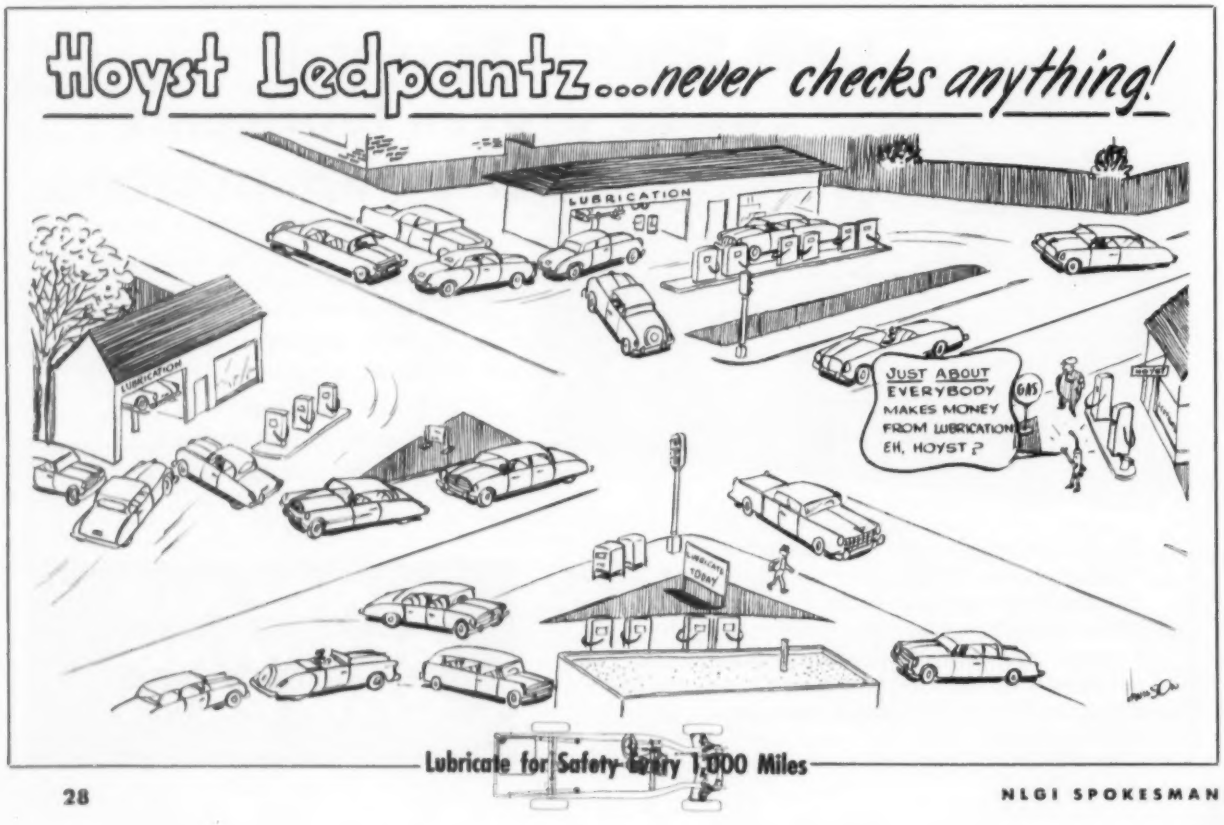
High melting indogen compounds, particularly those melting above about 250° F are specified as thickeners for production of novel greases in the Standard Oil (Indiana) patent 2,679,480. Indogen compounds referred to here are those having the following structural groups:

By use of such thickeners, it is possible to provide greases claimed to be stable and give excellent lubrication at above 250° F and, if silicone oil is employed as the lubricant vehicle, greases stable at temperatures up to 450° F may be obtained.

Examples of indogen compounds suitable for this purpose are: indigo, iso-indigo, 3-keto-indoline, isatide, isatin, etc. A typical grease was prepared by mixing 7 gms of DC550 phenyl methyl silicone polymer oil with 15 gms of a 20% by weight indigo paste. When tested in the A.B.E.C.-N.L.G.I. high-speed high-temperature bearing test at 450° F and 10,000 R.P.M., running in cycles of 20 hrs. operating and 4 hrs. at rest, the grease lubricated the bearing for 427 hrs. before failure.

Low Temperature Grease

A soap-thickened base oil comprising essentially a mixture of a polyether oil and a polysiloxane oil is disclosed for low temperature use in U. S. Patent 2,680,095 issued to California Research Corporation. Polyether oils cannot be used as base oils per se in grease compositions at temperatures as low as −100° F or as high as 400° F, apparently because they are readily susceptible to oxidation



at higher temperatures and become too viscous at lower temperatures. By combining them with polysiloxane oils, a base oil can be obtained which can be thickened to the consistency of a grease and remain stable and show low wear characteristics at elevated temperatures.

Among the polyether oils which may be used are those prepared from the various alkylene oxides, the higher 1,2-epoxides, the alkylene glycols, and mixtures of these. Molecular weights can be in the range, preferably, of 400-1000. Lithium is the preferred soap base metal. The ratio of polyoxyalkylene oil to polysiloxane oil preferably is 1:3.

Halocarbon Oil Greases

In Standard Oil Development Company's patent 2,680,719, a lubricating grease composition is described without the use of ordinary grease-forming soaps. It is noted that for some time a non-ash-forming grease has been desired, which will not leave any corrosive or friction-increasing deposits on the bearing surface when the grease base has become completely volatilized.

Halocarbon oils, such as polymers of chlorotrifluoroethylene, have been described in Patents 2,435,205-6, 2,467,145, and 2,515,115, and the products range in the molecular weight range of 500-1300. Such oils can be thickened to a grease composition by incorporating a minor amount of N-acyl-p-amino phenol, in which the acyl group contains 14-22 carbon atoms per molecule.

Such greases, besides not leaving any ash, are resistant to moisture and are claimed to be unaffected by heating to a high temperature. In addition, they are said to be completely reversible even when heated past the melting point of the thickener. Examples of the thickener include N-polmitoyl p-amino phenol, N-stearoyl p-amino phenol, N-arachidoyl p-amino phenol, etc.

To prepare the lubricating grease compositions, the desired acyl p-amino phenol is admixed with the halocarbon oil in proportions varying from 1% to 10% by weight of the phenol, to 99% to 90% by weight of the halogenated compound. The temperature then is raised to the melting point of the phenol, and the mixture is allowed to cool to room temperature wherein the acyl amino phenol recrystallizes in a dispersed state and causes formation of a stable grease structure.

The following example is given for the preparation of a satisfactory grease:

2% of N-stearoyl-p-amino phenol was admixed with a polymer of chlorotrifluoroethylene having a viscosity at 100° F. of 4.97 centistokes, a density of 1,878 and a molecular weight of approximately 550. The mixture was heated to about 250° F. while stirring and allowed to cool. The resulting composition had a smooth grease-like appearance. It was submitted to the standard grease inspection tests and gave the following results:

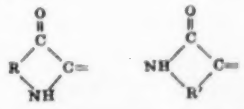
CONSISTENCY: mm./10

ASTM unworked penetration (at 77° F.)	205
ASTM worked penetration (60 strokes)	275
Worked penetration (1000 strokes fine hole worker plate*)	279

Dropping point—236°F.

Solubility in boiling water—nil.

*325-1/16" diameter holes.



Why Container Standardization

C. H. Phillips
J. G. Scully
Shell Oil Company

IN 1902 the steel barrel was first introduced to the oil industry in appreciable numbers. Up to this time only a few steel barrels were employed in this country; however, they were of foreign design, very heavily constructed and cumbersome to handle.

The famous "Bayonne Barrel," the first introduced domestically, was fashioned after the wooden bilged barrels then in general use. The superiority of the steel containers over the wooden barrels was quickly recognized and several companies were formed to carry on the development and manufacture of steel containers.

The straight-sided steel drum made its appearance in 1907. It was manufactured of 16-gauge terneplate sheet with soldered side seams and in many instances with soldered chime seams. Quickly following, under the guidance of the ICC, the infant industry developed the 18-gauge straight-sided as well as the 16-14 and 12-gauge steel drums with reinforced chimes and pressed-out I-bar rolling hoops.

Recommended Standards Developed

To date, approximately 70 odd manufacturers handle today's total annual output of approximately 31,000,000 drums and 61,000,000 30-gallon and smaller containers. Since the Petroleum, Grease, and Chemical Industries consume 70% of the drums manufactured and 40% of the pails produced for the various industries, The Petroleum Committee of the Packaging Institute, Incorporated, developed recommended standards for container dimensions based on sound engineering design and practical operating economics. It was recognized that these proposed standards would only pertain to dimensions and capacity of containers. Therefore, standardization in this instance would not affect the manufacturers' quality or workmanship.

The committee developed in their studies that container dimensions often varied with different manufacturers. It was not uncommon for a Lubricating Oil Packaging Plant to have, say, three 5-gallon can closing machines because of the number of suppliers furnishing the containers. A similar condition could exist in the supply of 100-pound openhead drums. The height of 55-gallon drums varied to such an extent that a fixed filler height was all but impossible. Telescopic devices were designed to afford adjustments for height discrepancies. Filled volumes ranged from 52-55 gallons, creating inventory problems, and resulting in confusion in shipping departments, especially for calculating shipping weights.

Standardization an Economic Boon

Standardization makes available containers of uniform size, eliminates the necessity of multiple closing tools, and by having containers of fixed dimensions we obtained assured filling capacities. With increased filling capacities, more product is filled and marketed in a given container.

Take for instance a filling plant producing 50,000 drums a year; if, with the standardized drum of greater capacities, three additional gallons are filled, an extra 150,000 gallons of product has been moved. Under pre-

standardization conditions this gallonage would represent roughly 3,000 drums. The economic advantages that accrue from such action are readily apparent.

17E Drum Very Popular

There is a trend in the Petroleum Industry to standardize on the 18-gauge drum. The 17E is the more popular because of the flexibility it offers. With the advances made in reconditioning in the past few years, these so-called single-trip containers are now making many round trips. The Bureau of Explosives has granted permission, upon proper application, to reuse the containers for products that flash between 20 to 80°F provided the drums are tested after reconditioning and meet the internal air pressure test as required for new ICC 17E drums. Compliance with this requirement must be clearly marked on the drum. This provision has simplified plant inventory to a large extent, and the 17E has become the standard drum for several companies.

Companies using 18-gauge 17E drums on a 100% basis have found no important restrictions necessary in their usage other than that they should not be used for shipping a few extremely high vapor pressure napthas, such as pentane, hexane, etc.

Assume for a moment our theoretical plant producing 50,000 drums a year. This plant has been using 16-gauge drums and now decides to change their standard to the 18-gauge ICC 17E drum including the new dimensions (57.2/57.65 gallons) recommended by the Packaging Institute, Inc. The following major benefits should be realized:

1. By the increased capacity, the equivalent of 3,000 drums would be saved at a cost of aproximately $24,000.
2. The lighter weight drums would effect a saving in over-the-road freight of approximately $750.00 a year.
3. From a conservation of national resources standpoint, the steel in ten 16-gauge drums is sufficient to build fourteen 18-gauge 17E drums, not to mention a saving of approximately $4.00.
4. Simplified accounting.

Standardization Benefits Many

The standardization of containers, particularly the new 120-pound keg, will eventually assist the manufacturers of dispensing equipment. For example, eventually it will not be necessary to develop adapters for their various equipment to fit the wide range of containers that existed prior to the Petroleum Industry's acceptance of the new Universal 120-pound drum standard.

Suppliers of containers will benefit by the standardization just as much as the user or the equipment house, mainly because he will be working with standard size metal sheets. The purchasing agent's life is bound to be an easier one when his source of supply of a particular container is not restricted by location or supplier. The filler's life is not made worse by not having to contend any longer with specialized machinery adapted to an individual supplier's specifications.

This factor was demonstrated some months ago when a canner was notified by his can supplier that the supplier's plant was on strike. The purchasing agent when informed of the condition immediately arranged for supplies from another source. This action saved the canner "down time" and he was able to continue to meet his production demand on the scheduled dates.

A few years ago this would have been all but impossible. The plant most likely would have been geared to one supplier's product. To change over would have entailed the exchange or possibly readjustment of machinery, a lengthy process, or shut down the plant and impose the load on one of the company's other plants not affected by the strike. Either course of action, under the conditions, would have been justified; however, in either case some delay would have been inevitable. In the latter case, added cost would have been incurred in rail transportation of filled containers and probably overtime at the plant that had to make up the others' production schedule.

Standardization carries many benefits that are not as dramatic as the above; for instance, improved warehousing results with standard size kegs and drums. Gone are the days of weak or wobbly stacks due to variable container heights. Another little publicized benefit is the improvement in loading techniques made possible through standard container sizes.

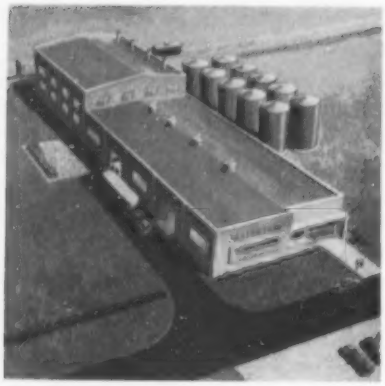
Standardization is a valuable tool to the purchasing agent and plant superintendent. It permits the state of flexibility so necessary to efficient buying. With standardization, any vendor conveniently located to a given plant is a potential supplier and, by proximity, delivery costs are minimized. It opens up avenues of greater supply and creates a more competitive field, giving a healthy influence on costs. Obviously this works to the buying public's advantage.

The plant man can, with various suppliers, schedule more frequent deliveries, thereby reducing the necessity of large inventories. Warehouse space reserved for the storage of empty containers can be converted to the storage of filled containers, affording that cushion so necessary to good production scheduling and plant operation.

Summary

Thus, container standardization can well be considered a boon to (1) the Buying Public, (2) the container supplier, (3) the equipment supplier, (4) the filler, (5) the shipper, and (6) the warehouseman.

Mass production has helped to make our country great and to lift our standard of living far above all other nations, but mass production depends largely on standardization. Therefore, it was inevitable that sooner or later standardization would burst out of individual company confines and spread its advantages to an industry as a whole such as ours.



New Battenfeld West Coast Plant

BATTENFELD GREASE AND OIL CORPORATION *to West Coast*

Battenfeld Expands

Expansion plans for the Battenfeld Grease & Oil Corp. have resulted in a new West Coast lubricating grease plant. A new corporation, Battenfeld Grease & Oil Corp. (Calif.) was formed to accomplish this purpose. Production began October 1, 1954, according to an announcement by Mr. A. J. Daniel, president of the Corporation. The promotion of R. S. Nowell to Vice-President and General Manager of the California Corporation was also announced. Nowell formerly held various management positions in the Kansas City Company.

The new facilities of the California Corporation are located in Los Angeles County at 19530 South Alameda, Compton, California. With other locations in North Tonawanda, New York; Minneapolis, Minnesota; and, Kansas City, Missouri, Battenfeld becomes the only independent lubricating grease manufacturer with nationwide manufacturing facilities.

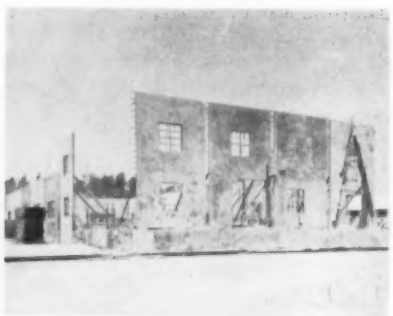
Building of Special Design

The modern one and one-half story building of reinforced concrete has been designed specifically for grease manfacturing and built for future expansion. The office and laboratory facilities occupy the front of the building while the warehouse and production equipment are housed in the rear.

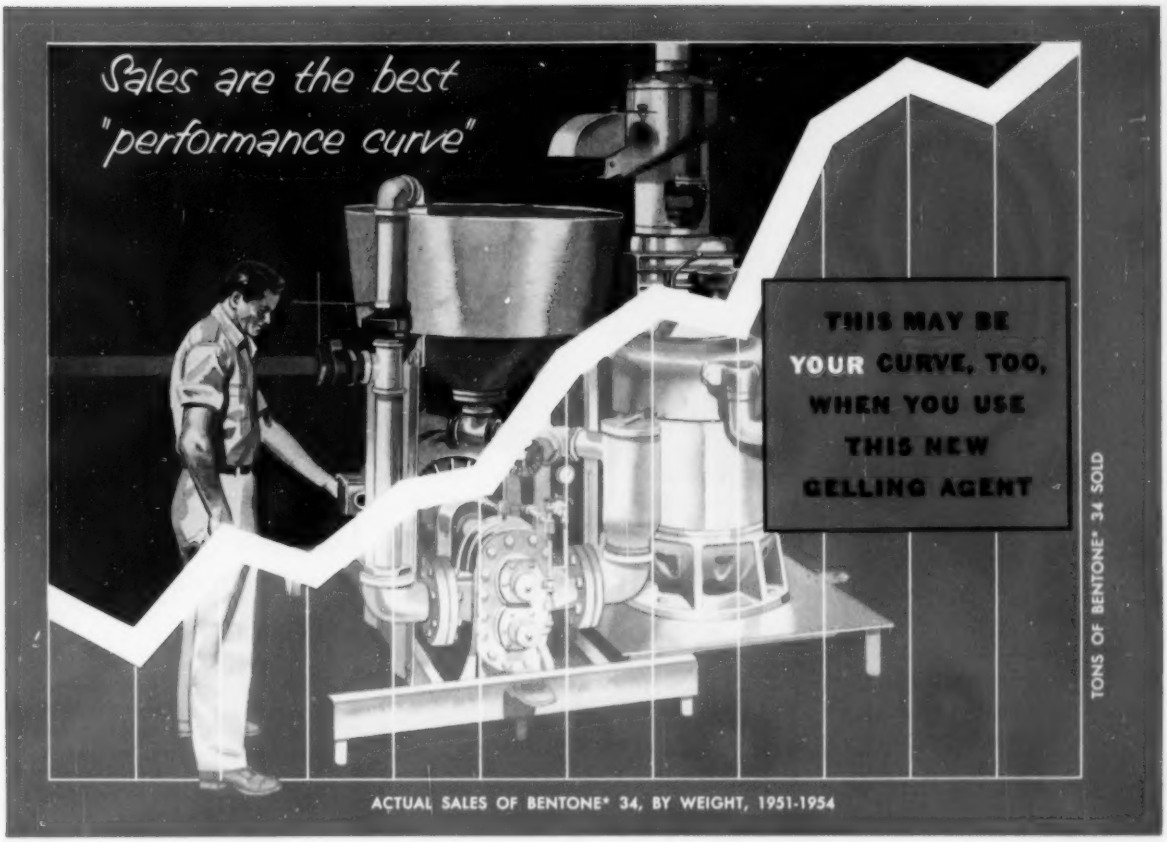
The completely new laboratory is designed and equipped for both grease research and production control, and is headed by Mr. H. E. Hale, formerly of the Kansas City laboratory. In addition to the special products formulated by the California laboratory, they will also have access to the extensive range of products built up by Battenfeld's Kansas City Laboratory since 1919.

New Construction Technique Used

An interesting facet of the new Battenfeld plant is the manner in which it was built. Hanson Construction Company, Paramount, California, was the general contractor. A new construction technique known as precast concrete was used. The Hanson Construction Company is a pioneer in this new building method that is particularly suited to Southern California. The walls, floors, footings, etc. were poured flat on the ground. After drying, they were raised or put in place by huge cranes. One of the advantages of this tilt-up type of construction is that the walls can be reused in any later expansion.



A new construction technique known as pre cast concrete was used to construct the new plant of the Battenfeld Grease & Oil Corporation (Calif.). After pouring the walls, footing, and floors they were raised or put into place by huge cranes.



MORE AND MORE GREASE COMPOUNDERS ARE CHANGING TO BENTONE* 34

Year after year the climbing sales of Bentone* 34 continue, as leading grease compounders see how easy it is to use this non-soap gelling agent. Its remarkable ability to withstand heat without melting, its excellent adhesion to moving metal parts, and its resistance to washing, are only three reasons why grease makers and users alike are changing to lubricants gelled with Bentone* 34.

Easily compounded with lubricating oil by milling in a standard commercial colloid mill or homogenizer, Bentone* 34 produces a multi-purpose, non-melting grease. Production of Bentone* 34 lubricants requires low investment in equipment and produces a grease of consistent high quality at low thickening cost. If you are not now one of the many firms making Bentone* 34 greases, write today for complete technical details.

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GROCO 58—HYDROGENATED TALLOW FATTY ACIDS

Titre	57.0° C. min.
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Color Lovibond 5¼" Red	1.0—2.0
Color Lovibond 5¼" Yellow	5—15
Unsaponifiable	0.25%—0.75%
Saponification Value	202-204
Acid Value	201—203
Iodine Value (WIJS)	3 max.

Write for our free booklet "Fatty Acids In Modern Industry."

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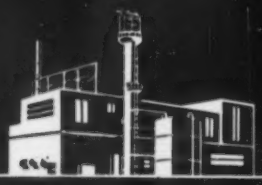

Award

FOR STEADY ACTION

...for steady packaging performance
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When you specify J&L Steel Drums and Pails you are assured of maximum protection for your product. In terms of "steady action" you can depend upon J&L because:

1. J&L Drums and Pails are made from high quality J&L Steel Sheet.
2. J&L Drums and Pails are made with care and accuracy in every detail.

You can obtain J&L Steel Drums and Pails through plants located in leading industrial centers. You'll find J&L service fast and efficient.

The J&L line includes all types of Closures and Finishes. Bright, colorful decorations may be reproduced to your specifications. Heavy-duty ICC Drums. Light-gauge Drums. 55, 30 and 15 gal. capacity and 100-lb. Grease Drums. Lightweight Drums for Chemical and Powdered Materials. 1-10 gal. capacity Steel Pails for Foods, Chemicals, Oils.

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PEOPLE in the Industry

Crump and Michener Promoted at Mallinckrodt

Two promotions have been announced recently, both in the laboratory chemicals sales division of Mallinckrodt Chemical Works, St. Louis.

Charles L. Crump was named western division sales manager in charge of laboratory chemicals. As western division sales manager, Crump will take over part of the responsibilities of Warren F. Michener, who formerly supervised western division reagent chemicals sales and who is now temporarily in charge of the Mallinckrodt Chicago office.

Before coming with Mallinckrodt Crump was in the laboratory supply field for 14 years.

A second appointment made by G. C. Bradshaw, western division general sales manager, made William W. Scott assistant western division sales manager in charge of laboratory chemicals. Scott joined Mallinckrodt in 1945 as a chemist in the analytical control laboratory. In 1948 he was transferred to the sales department and in 1950 to the sales of reagent chemicals.

As members of the Mallinckrodt central sales staff, Crump and Scott coordinate a sales, technical service and development program in the laboratory chemicals field. This includes servicing part of a network of 71 dealer outlets for Mallinckrodt Analytical Reagents.

Huber to Head OIIC Committee

W. R. Huber, general manager of public relations for Gulf Oil Corp., Pittsburgh, Pa., was elected Chairman of the National Oil Industry Information Committee for 1955, at a regular meeting of the OIIC in the Conrad Hilton Hotel in September.

Huber has been a member of the National Information Committee since its inception in 1947. During the past three years, he has been chairman of the subcommittee on advertising. He will take office in December, succeeding G. Stewart Brown, manager of public relations for Standard Oil Company of California.

The following vice chairmen were elected: J. H. Sembower, Shell Oil Co., San Francisco, Calif.; Roy M. Stephens, Humble Oil & Refining Co., Houston, Tex.; L. R. Kamperman, Leonard Refineries, Alma, Mich.; Kerryn King, The Texas Co., New York, N.Y.; Richard Rollins, Atlantic Refinery Company, Philadelphia, Pa.

John S. Cooke of the American Petroleum Institute, N. Y., was re-elected secretary.

As the three day meeting was concluded, the committee adopted its program for 1955. It will continue to supply factual information on the oil

"A LITTLE LUBRICATION BUSINESS WILL REMOVE THE JOLTS FROM THE TENTH OF THE MONTH--AS WELL AS FROM MOTOR CARS, HOYST!"

industry through the chain of more than 5,000 committees of oil men throughout the country. It will emphasize in 1955 getting even more local oil men to participate actively in its work. Present activities, including advertising, film distribution, and making material available on request to schools, will be continued.

Monsanto Personnel Changes

Desmond B. Hosmer, Belleville, Ill., has been named manager of the Anniston, Ala., plant of Monsanto Chemical Company's Organic Chemicals Division, it has been announced.

At the same time, it was announced that Wallace K. Belin, whom Hosmer replaces, will become production manager of the Monsanto plant now under construction at Kearny, N.J. The new plant, scheduled for completion early next year, is part of the Inorganic Chemicals Division.

A native of Michigan, Hosmer received the B.S. degree in chemical engineering in 1937 from the University of Michigan. He was employed by Monsanto the same year in the analytical laboratory at the W. G. Krummrich plant. Prior to his appointment as assistant plant manager there in 1950 Hosmer had been plant investigation group leader and operating superintendent.

Belin, who has been manager at Anniston since January, 1954, joined Monsanto in 1941, upon graduating from the University of Minnesota with a Bachelor of Chemical Engineering degree. He served in various capacities both at Anniston and the Trenton, Mich., plant where he was maintenance superintendent when he was appointed Anniston plant manager.

New General Manager of J. & L. Container Division

Chauncey K. Hubbard, Greenwich, Connecticut, has been named General Manager of the Container Division of Jones & Laughlin Steel Corporation. He succeeds F. T. Barton who recently was named Vice President, Special Products and Services of the company.

Mr. Hubbard, formerly Vice President of the Rockwell Manufacturing Company, came to J&L a year ago as assistant to Mr. Barton.

Mr. Hubbard was with Rockwell Manufacturing Company from 1936 to 1953 and with the Mellon National Bank and Trust Company from 1929 to 1936.

PROGRESS THRU RESEARCH . . . at GENERAL MILLS

Fatty Acids Score for Grease Making ☆☆☆☆☆ General Mills Offers Full Line ☆☆☆☆☆ Assures Uniformity, Higher Yield

Grease Making Fats, today, must do much more than just make economical grease. To meet competition . . . and the lubricating demands of today's trains, trucks, planes, machines and equipment, for example . . . they must also be stable, fast acting, high yielding, and, above all, offer the finest formulating tolerances.

That's why General Mills fatty acids are fast winning favor with grease manufacturers. They fill the needs of today's industry, and show great promise for the demands of tomorrow. Here's how!

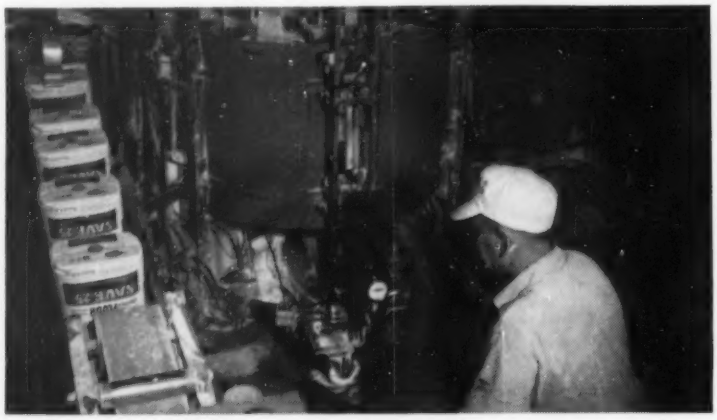
1. **General Mills fatty acids are low in oxidizable, poly-unsaturated acids.**
2. **Trace metal contaminants, such as copper and nickel, are almost completely removed.**
3. **They have 5 per cent more reactive materials than whole fats, often boost grease yields 15 to 25 per cent.**
4. **General Mills fatty acids saponify almost instantly; give you faster "kettle turnover" or high speed continuous operation.**
5. **They cut handling costs. Most are now available, at no added cost, in pallet shipments—40 to 60 bags to the pallet.**
6. **They are made from carefully-selected tallows, processed for uniformity and stability.**
7. **This purity and uniformity allows you to create special fine-tolerance formulations to meet special lubricant needs.**
8. **They help you avoid off-grade grease batches and re-working expense.**
9. **These acids help prevent drastic changes in grease quality often caused by slight variations in unsaturation.**
10. **Glycerine and muscilaginous matter are removed, leaving a minimum of inert or oxidizable impurities.**

Finally, General Mills offers you a full line of grease-making fatty acids. You can choose the material you need with the assurance that it will be uniform and available.

☆☆☆☆☆

Stop and Consider all of these benefits before deciding on your next improvement in grease-making raw materials. You likely will find that one or more of the General Mills fatty acids are just what you need.

There are General Mills Aliphats (fatty acids) 26-A and 26-B, fractionally distilled animal fatty acids. The first is an experimental fatty acid showing promising results for soda base greases. Aliphat 26-B (with myristic acid largely removed) is often used for lime greases and gives especially high yields of soda-base greases.



Simultaneously servicing 416 grease points on 5 machines, the modern industrial grease unit, above, uses #32 solidified oil grease on a bag packer, hot dryer, weigher, coupon dropper, and bag sealer.

Aliphat 26-C is a whole distilled grade of animal fatty acids. Its light color and uniformity make it a favorite with lime-grease makers. Its high stearic acid content also boosts calcium grease yields.

Then there's Aliphat 6-B comparable to "double pressed" commercial stearic acid. It has a saturated acid ratio of approximately 60% palmitic and 40% stearic acid. Aliphat 6-C, equivalent to "single pressed" stearic acid, is used for certain lithium greases. Aliphat 46-C, a mixed vegetable fatty acid, is light in color and low in cost. Often it's mixed with tallow acids for more mechanically stable lime greases. Distilled cottonseed type fatty acid 33-L, produced especially for grease manufacturers, is used in a variety of low cost greases.

☆☆☆☆☆

General Mills has developed and improved these, and other, fatty acids especially for grease making. The acid radicals correspond to those found in most natural fats, such as tallow. They overcome most of the vagaries of climate, location, stock feeding methods, and supply practices.

If you would like technical data on the General Mills fatty acids mentioned above, or those best suited for your special formulating problems, please mail the coupon or write on your letterhead today.

SEND THIS COUPON:

PROGRESS THRU RESEARCH

General Mills ☆☆☆☆☆ **CHEMICAL DIVISION**
KANKAKEE, ILLINOIS

Please send me technical information on General Mills fatty acids.

Aliphats: ☐ 6-B ☐ 6-C ☐ 26-A ☐ 26-B ☐ 26-C
☐ 33-L ☐ 46-C ☐ Hydrogenated Tallow Glycerides

I would like a formulating sample of fatty acid for:

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Firm _____

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Battenfeld Executive

R. S. NOWELL

Battenfeld Grease & Oil Corporation announces the promotion of R. S. Nowell to Vice President and General Manager of their newly organized West Coast plant. Battenfeld Grease & Oil Corp. (Calif.) began operations on October 1, 1954, in a completely new and modern lubricating grease plant at 19530 South Alameda, Compton, California, in Los Angeles County.

Mr. Nowell was formerly Sales Manager, Waterproofing Division of Battenfeld's home office in Kansas City. Prior to that he spent a number of years as Plant Superintendent, and Territorial Sales Representative.

Shell Names R. E. Porter Chief Pilot for Aviation

Robert E. Porter has been promoted to the newly-created position of chief pilot for Shell Oil Company. In his post in the company's aviation department, Mr. Porter will coordinate the operations of aircraft employed by Shell and its affiliates throughout the United States and Canada.

Used to save time and increase efficiency, some of the planes speed pilot salesmen on company business, while others transport exploration and production department personnel, patrol pipe lines and make emergency deliveries of equipment and supplies.

The new chief pilot enlisted in the U.S. Navy in July, 1940, and rose to the rank of lieutenant commander. During World War II, he served with the naval air arm as a transport pilot in this country, Alaska and the South Pacific. From 1947 until December, 1949, he owned and operated a Shell service station in Los Angeles. He then joined Midwest Airlines in Omaha, Nebraska, serving as an airline captain and superintendent of maintenance.

Porter joined Shell in March, 1952, as a pilot for its exploration and production department in Casper, Wyoming. He was transferred to New York last March.

One pound of crude oil can produce three times as much heat as a pound of TNT, which is made from toluene, an oil product.

Industry NEWS

Naval Stores Breakfast

The 1954 Naval Stores breakfast will be held on Wednesday, November 17, at 8:15 a.m. in Banquet Room 17, at the Palmer House, Chicago.

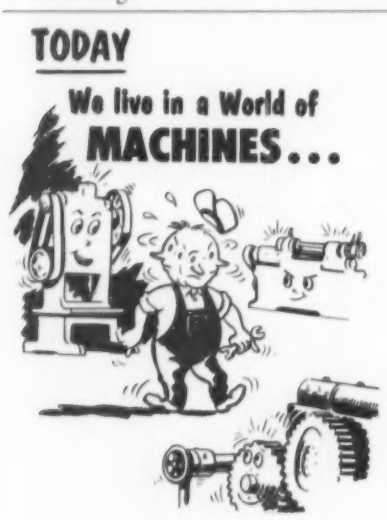
The Naval Stores Breakfast which is a traditional part of the National Paint, Varnish and Lacquer Association Convention is being sponsored by the Chicago Club and will again give members of the industry an opportunity to renew their acquaintance and exchange views.

Anyone interested in attending this meeting will be cordially welcomed and registration or membership in the National Paint, Varnish and Lacquer Association is not necessary.

These informal breakfast meetings have always proven very instructive. Leading and recognized analysts such as Dr. W. David Stallcup, the Glidden Company Naval Stores Division, H. L. Meyer of International Naval Stores Co., A. E. Griffin of Camp Manufacturing Co., Mr. E. E. Holdman of Newport Industries, G. A. Wharry and others will present a survey of conditions on the Wood, Gum and Sulphate Industries.

Users and manufacturers of Fatty Acids are most welcome and are urged to attend.

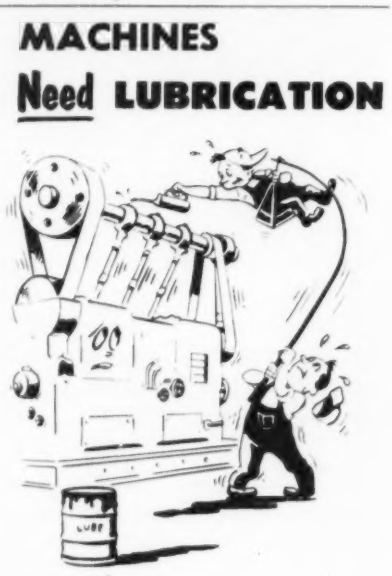
Address as early as possible advance reservations to Mr. Philip E. Calo, Chairman, Naval Stores Breakfast Meeting, c/o Philip E. Calo Company, Inc., 333 North Michigan Avenue, Chicago 1, Illinois.

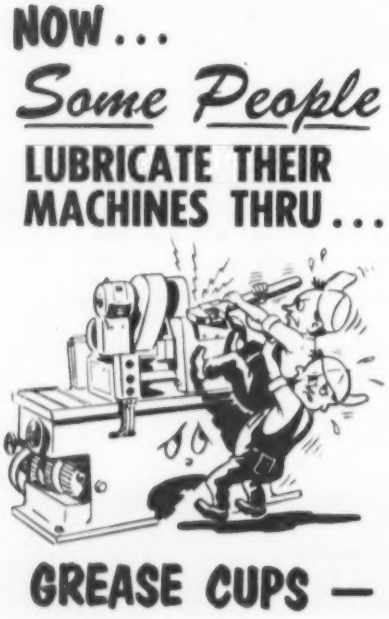


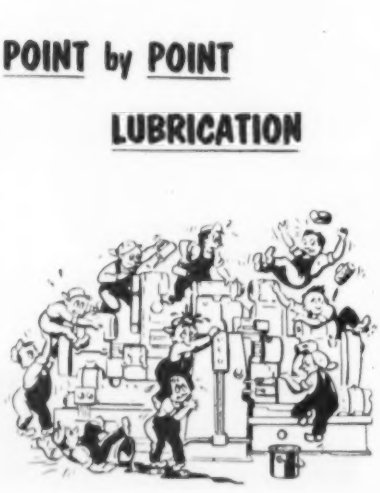
Alemite Issues Clever Publication

Just issued by the Alemite division of Stewart-Warner Corporation is a humorous thirty-two page booklet of cartoons. It tells their story of "versatal" materials handling equipment in an unusual but understandable manner. Five of the many cartoons are reproduced here illustrating how one company gets its sales story across.

Divided into sections it carries a continuous story particularly helpful to maintenance and production men, purchasing agents and others who are occasionally stumped by the prospect of ordering out the proper combination of equipment. It is available to anyone ordering it from the company or it's branches.







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30% and 33% soaps for better film strength, oiliness and anti-seize characteristics, plus anti-corrosion protection properties in gear oils. Their clarity is outstanding.

WITCO
Aluminum Stearates

22, 22-H, 23, 22-C, 22-G, from medium to extremely high gels of excellent stability, smoothness and color. Specifically designed for transparent waterproof greases. Their superior gel strength makes for greater economy.

Write today for complete information. Samples for your investigation on request.

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LONDON AND MANCHESTER, ENGLAND

Deep Rock Safety Record Passes Million Hour Mark

A million man-hours of work without a disabling accident is the record hung by Deep Rock Oil Corporation's refinery.

"This is a great tribute which Deep Rock's team has paid to itself," R. M. Chesney, vice-president, said. "We give full credit for this fine record to the employees who made it. The finest equipment and safety methods in the world won't protect the men if they don't cooperate, and our group is among the best when it comes to observing safety practices."

Stanley Learned of Bartlesville, president of the Oklahoma Safety Council, wired congratulations to the Deep Rock organization, pointing out how such record performances contribute to Oklahoma's stature as a manufacturing state.

Last year the Deep Rock refinery received the National Safety Council's Award of Merit, and hopes this year to be eligible for the Award of Honor, industry's highest safety recognition. Carlos Blount, Deep Rock safety director, said he believed the company's 1954 record thus far would cinch the top award, and that "everyone's fingers are crossed to protect the record for the rest of the year."

New Steel Container Capacity Restrictions Benefit Petroleum and Chemical Industries

New uniform capacity restrictions originally proposed for a number of ICC specifications by the Steel Shipping Container Institute, Inc., New York, to provide added capacities for the petroleum and chemical industries, have been adopted by the Interstate Commerce Commission, effective December 2.

The specifications affected are ICC-5B, 17C, 17E, 17H and 17X, wherein minimum actual capacity of containers is defined as not less than rated (marked) capacity plus four per cent and maximum actual capacity as not greater than rated (marked) capacity plus five per cent or rated (marked) capacity plus four per cent plus one quart whichever is greater.

Amendments are the result of long intensive study of the present-day

Big tankers carry up to 240,000 barrels of oil per trip.

requirements of the chemical and petroleum industries by the Steel Shipping Container Institute Technical Advisory Committee in cooperation with the Petroleum Packaging Committee of the Packaging Institute and the Manufacturing Chemists' Association Metal Packages Committee. The capacity proposals were adopted by the Bureau of Explosives upon the approval and recommendation of the latter two organizations.

The Steel Shipping Container Institute, representing by volume over 95 per cent of the Nation's steel shipping container manufacturers, is alert to the needs of the expanding petroleum and chemical industries, collectively the largest users of containers, and it is continuing its close cooperative work with the above-mentioned committees to insure a steady supply of finest quality containers best suited for these two industries.

To drill an exploratory well costs about $100,000 and only one out of every nine turns out to have oil.

There are over 168,000 miles of oil pipe line in America—enough to encircle the earth more than six times.

Emile du Pont Addresses Maine Safety Conference

The economic well-being of employees is inseparable from that of management and full understanding of this fact is vital to the strength of the nation, Emile F. du Pont said recently.

Mr. du Pont, director of the Employee Relations Department of the du Pont Company and chairman of the board of the National Safety Council, addressed the 27th annual Maine State Safety Conference.

He pointed out that the industrial safety campaign has been successful because management has been able to demonstrate a mutual interest in the physical welfare of employees. The mutual interest in the economic sphere may not be as apparent at first glance and "this is where understanding is needed in industry," he said.

The outstanding improvement in industrial safety is an example of what can be accomplished through cooperation of management and workers, Mr. du Pont said. At the same time, he reported, a recent survey indicated that while most employees feel they can depend on management to make working conditions as safe as possible, only a minority believe management is interested in their economic welfare.

"It seems vital to me that we who are in management develop better ways of explaining business," he said. "This is a national problem, but it cannot be solved by some action in Washington or New York. It must be tackled by management everywhere, with each plant in each community taking the initiative to create understanding among their own people, for understanding begins at home."

It may be more difficult to demonstrate the mutuality of interest in the economic sphere, Mr. du Pont said. "Certainly the self interest of the worker in the profitable operations of his company may not seem so apparent at first glance as his self interest in better safety.

"Yet even where management and employees disagree over how the rewards of production should be shared, it should be obvious that greater production would provide larger shares for all concerned. For it is increased production, resulting from tools and machinery which increase individual productivity, that gives us our higher standard of living.

"This is where understanding is needed in industry, and this is where management has neglected its obligation to spread information on how our business system operates, and how the economic welfare of employees is inseparable from the economic welfare of management and owners."

Reviewing the record of accomplishment in industrial safety, Mr. du Pont said that "the safety movement, instead of basking in the glow of past accomplishments, must be pursued even more vigorously."

Although the 1953 death rate from accidents, 60 per 100,000 population, was the lowest on record, Mr. du Pont cited a toll in the United States last year of 95,000 lives and 9,600,000 injuries. "The time lost by workers from accidents of all kinds," he said, "was equal to a year's shutdown of industrial plants employing 1,100,000 men and women.

"Electronic Brain" to Assist Gulf Scientists

An "electronic brain" of the most advanced category—technically known as a general purpose, stored-program digital computer—has been added to the facilities of Gulf Oil Corporation's laboratories at Harmarville, Pa. Valued at about $110,000, it is expected to greatly accelerate many phases of the company's research.

The machine is the larger of the first two of its kind in operation in the Pittsburgh district (the other is being simultaneously installed by a major manufacturing company). Less than 100 such machines are yet in world-wide use, the great majority by governmental departments and universities.

The new computer is expected to quickly repay its cost by its rapid-fire solution of the difficult mathematical problems which are greatly increasing in every phase of petroleum research. The computer totes up its answers 50 times faster than a human mathematician equipped with an electric desk calculator and several hundred times faster than one not so equipped.

The machine proper is housed in a compact cabinet 2½ feet by 5 feet by 6 feet. Included in this space, are 5,000 germanium diodes (substituting for vacuum tubes), about 400 tubes proper, and many resistors, condensers and relays, all joined by well over 100,000 connections.

Edward B. Weinberger, left, head of the laboratories' computational analysis section, checks a problem which the young lady will encode and feed to the machine through an electric typewriter. In background, computer engineer Roger Evans makes adjustment on main computer cabinet.

Midwest Research Institute Utilizes Unique Computer

A unique computing device which can project through the magic of electronics the facets of an entire pipeline distribution system is aiding many Southwestern firms, including Oklahoma companies, in solving complex problems.

The device, a McIlroy Pipeline Network Analyzer, is in use at the Midwest Research Institute in Kansas City. It is an analog type computer, and is one of only three such units in the nation. It is put to work to study problems of water, gas, steam, petroleum and sewer network systems. It can pinpoint, for example, weak points in a pipeline system, and can provide values for expected flow and pressure drops under various load conditions.

One recent survey for an Oklahoma company enabled the firm to redesign certain portions of a pipeline network and, thus, to eliminate low-pressure points within the system, a serious situation in case of fire.

By use of fluistors, which have special electrical characteristics, the size, length and condition of pipelines are projected on a panel of the device. These electronic tubes respond to electrical current in the same manner as pipes respond to the flow of water, gas, steam, or oil. Tubes of various sizes correspond to pipe sizes and can be plugged into sockets at the back of the machine to duplicate distributions systems. Answers are obtained by reading voltage and current meters at the front of the device.

Meyercord Offers Guide to Truckers

The Meyercord Co., decalcomania manufacturer of Chicago, Illinois, has put the old familiar checker board to work as a solution to a sales problem. The Meyercord art department developed a "checker guide" measuring three by twelve inches in size, divided into 36 inch-square "checkers." This guide, printed on heavy paper stock is offered to truck and fleet owners interested in decal signs for their vehicles. The checker guide is temporarily attached, in turn, to the front, side and rear of the truck and each perspective is photographed with any camera available. The prints are then sent to Meyercord with a built-in guide that can be translated to the exact dimensions of the sign required. Those interested may secure the checker guide by writing to The Meyercord Co., 5323 West Lake Street, Chicago 44, Illinois.

Deep Rock Accepts General American Offer

Deep Rock Oil Corporation stockholders have voted by an overwhelming majority to accept an offer by General American Oil Company of Texas of $27,000,000 for certain of Deep Rock's physical properties.

The vote, disclosed at a stockholders' meeting held at Deep Rock headquarters, was a formal endorsement of action taken in July by the board of directors.

Deep Rock President W. H. Garbade said 76 per cent of all outstanding shares were voted in favor of the sale with only 1.5 per cent opposing.

Major products made from crude oil are gasoline, kerosine, light and heavy fuel oils, lubricating oils, wax, asphalt, and coke.

At the end of 1953, the United States had 501,859 producing oil wells scattered through 28 states. Many of these wells produce both oil and gas.

FUTURE MEETINGS of the Industry

OCTOBER, 1954

17-20 American Institute of Mining and Metallurgical Engineers (fall meeting, petroleum division), Plaza Hotel, San Antonio, Texas.

Week of
Oct. 18 Society of Automotive Engineers (national transportation meeting), Boston, Mass.

18-19 American Petroleum Institute (Division of Refining Committee on Training), Brown Palace Hotel, Denver, Colo.

18-19 American Society of Lubrication Engineers, Lord Baltimore Hotel, Baltimore, Maryland

18-20 SAE National Transportation Meeting and Truck and Bus Engineering Displays, Sheraton-Plaza Hotel, Boston, Mass.

18-22 National Safety Council, Chicago, Ill.

19-21 Texas Oil Jobbers Assn. (management institute), Driskill Hotel, Austin, Texas

20 West Virginia Petroleum Assn., Daniel Boone Hotel, Charleston, W. Va.

20-21 Nebraska Petroleum Marketers Assn. (annual convention), Paxton Hotel, Omaha, Neb.

21-22 Western Petroleum Refiners Assn. (Garrett Hotel), El Dorado, Ark.

21-23 Rocky Mountain Oil & Gas Assn. (annual convention), Cosmopolitan Hotel, Denver, Colo.

24-26 Independent Petroleum Association of America, Mayo Hotel, Tulsa, Okla.

25-27 NLGI ANNUAL MEETING, MARK HOPKINS HOTEL, SAN FRANCISCO, CALIF.

25-29 American Institute of Electrical Engineers (fall general meeting), Chicago, Ill.

26-27 Society of Automotive Engineers, national diesel engine meeting, Hotel Statler, Cleveland, Ohio.

26-28 Texas Oil Jobbers Assn. (management institute), Caprock Hotel, Lubbock, Texas

27 So. Carolina Petroleum Industries Committee, Columbia Hotel, Columbia, S. C.

27-29 American Institute of Electrical Engineers (Conference for Petroleum Industry), Mayo Hotel, Tulsa, Okla.

27-30 American Society of Mechanical Engineers (annual engineering conference), Statler Hotel, Los Angeles, Calif.

28-29 American Petroleum Institute (Executive Committee of the Board of Directors), The Greenbriers, White Sulphur Springs, W. Va.

28-29 Georgia Independent Oil Men's Assn., Radium Springs Hotel, Albany, Ga.

NOVEMBER, 1954

4 West Central Texas Oil & Gas Assn. (annual meeting), Abilene, Texas

4-5 Society of Automotive Engineers (national fuels and lubricants meeting), Mayo Hotel, Tulsa, Okla.

8-11 American Petroleum Institute (34th annual meeting), Conrad Hilton Hotel and Palmer House, Chicago, Ill.

9-10 American Petroleum Institute (Meeting of Board of Directors), Conrad Hilton Hotel, Chicago, Ill.

10 American Petroleum Institute (meeting Executive Committee of the Board of Directors), Conrad Hilton Hotel, Chicago, Ill.

15-17 National Conference on Standards (fifth conference), Roosevelt Hotel, New York, N. Y.

15-17 American Petroleum Credit Association (annual conference), Muehlebach Hotel, Kansas City, Mo.

15-17 American Standards Association (annual meeting), Roosevelt Hotel, New York, N. Y.

15-17 National Conference on Standards (5th conference), Roosevelt Hotel, New York, N. Y.

18 National Industrial Conference Conrad Hilton Hotel, Chicago, Ill.

18-19 National Assn. of Corrosion Engineers (annual conference), Biltmore Hotel, Los Angeles, Calif.

28 to Dec. 3 American Socy. of Mechanical Engineers, Statler Hotel, New York, N. Y.

29-30 Packaging Institute (Petroleum Packaging Committee), New York, N. Y.

DECEMBER, 1954

2-7 National Exposition of Power and Mechanical Engineering, Commercial Museum, Philadelphia, Penna.

3-4 Interstate Oil Compact Commission, Drake Hotel, Chicago, Ill.

5-8 American Society of Agricultural Engineers (winter meeting), Edgewater Beach Hotel, Chicago, Ill.

8-10 Oil Industry Information Committee, Waldorf-Astoria, New York, N. Y.

12-15 American Inst. of Chemical Engineers (annual meeting), Statler Hotel, New York, N. Y.

27-30 American Association for the Advancement of Science, University of California, Berkeley, Calif.

JANUARY, 1955

10-14 Society of Automotive Engineers (golden anniversary annual meeting), The Sheraton-Cadillac Hotel and Hotel Statler, Detroit, Michigan

20-21 National Industrial Conference Board, Hotel Astor, New York, N. Y.

FEBRUARY, 1955

13-18 ASTM Committee D-2 on Petroleum Products and Lubricants, Rice Hotel, Houston, Texas.

15-17 Texas Oil Jobbers Assn. (management institute), Driskill Hotel, Austin, Texas

16-17 American Petroleum Institute (Division of Marketing, Lubricating Committee) Sheraton-Cadillac Hotel, Detroit, Mich.

MARCH, 1955

15-17 Ohio Petroleum Marketers Association (spring convention and trade exposition), Deshler-Hilton Hotel, Columbus, Ohio.

17-19 Texas Oil Jobbers Assn. (annual convention and trade exposition), Gunter Hotel, San Antonio, Texas

24 National Industrial Conference Board, Shamrock Hotel, Houston, Texas

APRIL, 1955

11-15 Greater New York Safety Council (annual convention and exposition), Statler Hotel, New York, N.Y.

13-15 American Society of Lubrication Engineers (tenth annual meeting and lubrication exhibit), Hotel Sherman, Chicago, Illinois.

MAY, 1955

9-12 American Petroleum Institute (Division of Refining, midyear meeting), Jefferson Hotel, St. Louis, Mo.

16-18 American Petroleum Institute (Division of Marketing, Lubrication Committee), The Greenbrier, White Sulphur Springs, W. Va.

16-18 American Petroleum Institute (Division of Transportation, Products Pipe Line Conference), Edgewater Beach Hotel, Chicago, Ill.

19-20 National Industrial Conference Board, Waldorf-Astoria Hotel, New York, N. Y.

23-25 American Petroleum Institute (Division of Marketing, midyear meeting), Chase and Park Plaza Hotels, St. Louis, Mo.

JUNE, 1955

6-15 Fourth World Petroleum Congress, Rome, Italy.

12-17 SAE Golden Anniversary Summer Meeting, Chalfonte Haddon Hall, Atlantic City, N. J.

OCTOBER, 1955

23-25 National Assn. of Oil Equipment Jobbers (4th annual meeting), Hotel President, Kansas City, Mo.

31 to Nov. 2 NLGI ANNUAL MEETING, EDGEWATER BEACH HOTEL, CHICAGO, ILL.

NOVEMBER, 1955

14-17 American Petroleum Institute (35th annual meeting), San Francisco. Calif.

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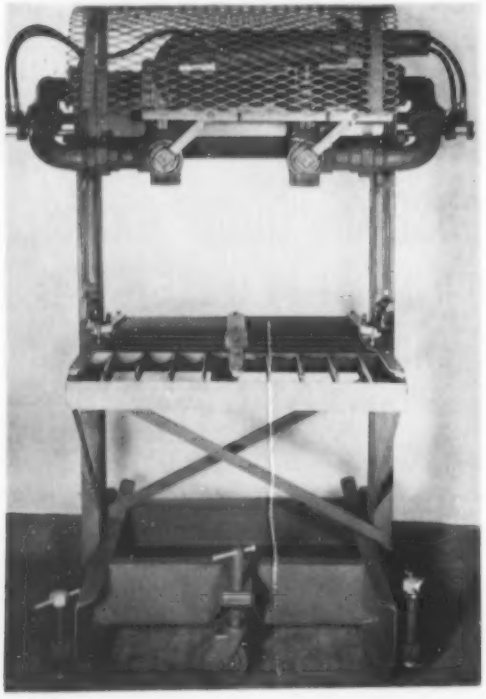
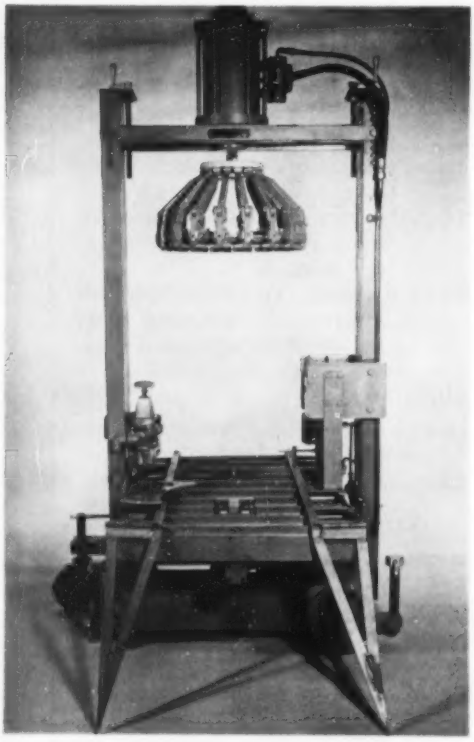


Model AC-3U (right) Fully Automatic, Air-Operated Crimping Machine for 120/100 Lb. Grease Drums.

Model GF-35 (left) Semi-Automatic Filling Machine for 25 to 35 Lb. (5-Gallon) Combination.



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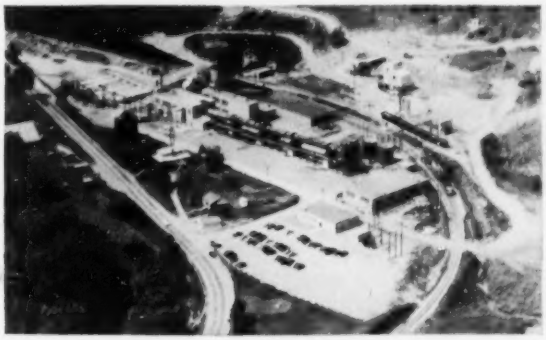

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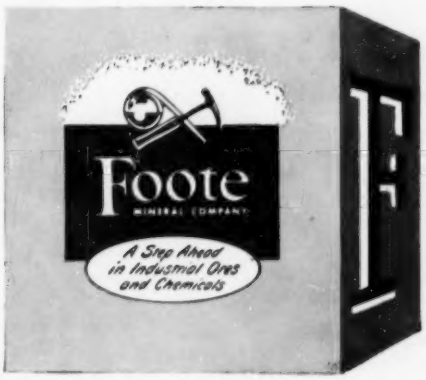

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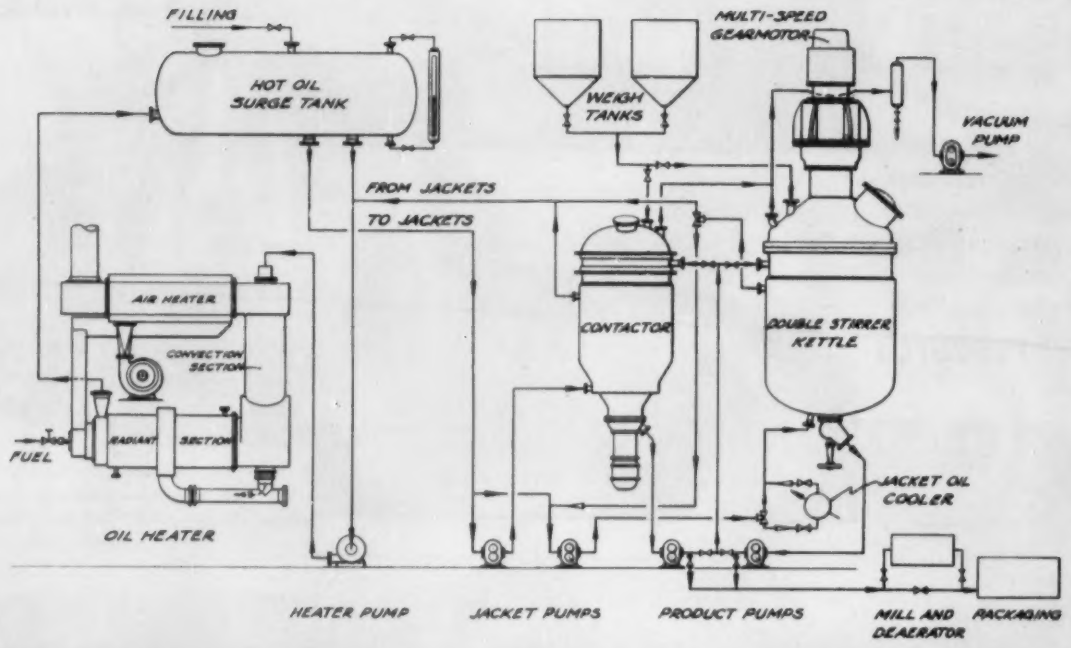

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